

What is claimed:

1. A mobile communication system in which a base station and mobile stations perform communication by a slotted-ALOHA method, the system being characterized in that a predetermined offset time is set between downstream communication frames from the base station to each mobile station and upstream communication frames from the mobile station to the base station;

the base station transmits a transmission permission signal for permitting transmission of one frame of data when a particular one of the upstream communication frames is available, determines whether or not continuous transmission of subsequent data over a plurality of frames should be permitted if the subsequent data exists subsequently to the one frame of data received through the particular frame from one of the mobile stations, and transmits a continuous transmission permission signal for permission of the continuous transmission when the continuous transmission is permitted; and

if each mobile station has data to be transmitted, it transmits one frame of data in response to the transmission permission signal from the base station, and transmits the subsequent data through a plurality of consecutive frames in the upstream communication frames when receiving the continuous transmission permission signal with respect to the transmitted one frame of data.

2. The mobile communication system according to

claim 1, characterized in that the upstream communication frames from the mobile station to the base station are delayed from the downstream communication frames from the base station to the mobile station by a  
5 predetermined time period longer than one frame;

the base station transmits the transmission permission signal through the frame in the downstream communication frames corresponding to the first frame in the upstream communication frames if the first frame in  
10 the upstream communication frames is available;

if the mobile station has data to be transmitted, it transmits the one frame of data through the first frame in the upstream communication frames when receiving the transmission permission signal through the  
15 frame corresponding to the first frame;

determination is made as to whether or not continuous transmission of subsequent data over a plurality of frames should be permitted if the subsequent data exists subsequently to the one frame of  
20 data received through the particular frame from the mobile station, and the continuous transmission permission signal is transmitted through the second frame a predetermined number of frames after the frame corresponding to the first frame when the continuous  
25 transmission is permitted; and

when the mobile station receives the continuous transmission permission signal through the second frame in the downstream communication frames, it transmits the subsequent data through a plurality of consecutive  
30 frames in the upstream communication frames the leading

one of which corresponds to the second frame.

3. The mobile communication system according to claim 1, characterized in that when the mobile station  
5 receives the continuous transmission permission signal, it transmits the subsequent data through the consecutive frames without checking whether or not the base station has succeeded in reception.

10 4. The mobile communication system according to claim 1, characterized in that the mobile station has a half-duplex-type configuration capable of selectively executing transmission processing and reception processing; and

15 when the mobile station receives the transmission permission signal in a receiving mode, and if data to be transmitted exists, it transmits the one frame of data in the upstream communication frame by selecting a transmitting mode in place of the receiving mode,  
20 thereafter receives the downstream communication frame by selecting the receiving mode, and, when receiving the continuous transmission permission signal, continuously transmits the subsequent data through the plurality of frames in the upstream communication frames by selecting  
25 the transmitting mode.

5. The mobile communication system according to claim 1, characterized in that the base station transmits, together with the continuous transmission  
30 permission signal, information as to whether or not one

frame of data has been normally received from the mobile station; and

the mobile station determines whether or not the base station has normally received the one frame of data transmitted from the mobile station, and transmits the subsequent data if it determines that the base station normally receives the data.

6. The mobile communication system according to claim 1, characterized in that the base station transmits mobile station identification information for identification of one of the mobile stations together with the continuous transmission permission signal; and

the mobile station transmits the subsequent data when the mobile station identification information designates the mobile station.

7. The mobile communication system according to claim 1, characterized in that the mobile station transmits information for identification of the number of frames of the subsequent data together with the one frame of data;

the base station transmits a transmission inhibition signal for inhibiting data transmission from the other mobile stations during transmission of the subsequent data by the mobile station on the basis of the number of frames of the subsequent data notified from the mobile station; and

the mobile station that has transmitted the one frame of data in the mobile stations continuously

transmits the subsequent data according to the continuous transmission permission signal, the other mobile stations restraining themselves in response to the transmission inhibition signal from performing data transmission during transmission of the subsequent data.

8. The mobile communication system according to claim 1, characterized in that if the mobile station cannot receive the transmission permission signal during a predetermined time period in a case where it has data to be transmitted, it recognizes transmission failure, sets a delay time, and again executes processing for awaiting reception of the transmission permission signal after a lapse of time through the delay time.

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9. The mobile communication system according to claim 1, characterized in that the base station transmits a continuous transmission non-permission signal when it does not permit continuous transmission of data subsequent to the one frame of data; and

each mobile station determines whether or not the base station has received the one frame of data transmitted from the mobile station, keeps on standby for transmission of the subsequent data after a lapse of a predetermined frame period if it determines that the base station has received the data, and if it has received the continuous transmission non-permission signal, and transmits the leading one frame of data in the subsequent data if it receives the transmission permission signal during standby.

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10. The mobile communication system according to claim 1, characterized in that the base station includes means of determining whether or not the continuous transmission should be permitted on the basis of a  
5 condition of traffic.

11. A base station for use in a mobile communication system in which communication is performed by a slotted-ALOHA method, the base station being  
10 characterized in that a predetermined offset time is set between downstream communication frames from the base station to a mobile station and upstream communication frames from the mobile station to the base station, the base station also being characterized by comprising:

15 transmission permission signal transmitting means of transmitting, through a predetermined frame in the downstream communication frames, a transmission permission signal for permitting transmission of one frame of data when one of the upstream communication  
20 frames is available;

receiving means of receiving one frame of data transmitted from the mobile station through one of the upstream communication frames corresponding to the predetermined frame; and

25 continuous transmission permission signal transmitting means of determining whether or not continuous transmission of subsequent two or more frames of data should be permitted if the subsequent frames of data exists subsequently to the received one frame of  
30 data, and transmitting through the downstream

communication frame a continuous transmission permission signal for permission of the continuous transmission when the continuous transmission is permitted.

5           12.     A mobile station for use in a mobile communication system in which communication is performed by a slotted-ALOHA method, the mobile station being characterized in that a predetermined offset time is set  
10     station to the mobile station and upstream communication frames from the mobile station to the base station, the mobile station also being characterized by comprising:

            transmission permission signal receiving means of receiving a transmission permission signal from the base  
15     station;

            leading data transmitting means of transmitting one frame of leading data through one of the upstream communication frames in response to the transmission permission signal if the data to be transmitted exists;

20           continuous transmission permission signal receiving means of receiving one of the downstream communication frames subsequently to transmission of the leading data to receive a continuous transmission permission signal; and

25           continuous transmission means of continuously transmitting data subsequent to the leading data through a plurality of frames in the upstream communication frames in response to the continuous transmission permission signal.

13. A communication method in which a first and second communication devices perform communication by a slotted-ALOHA method, the method being characterized in that a predetermined offset time is set between first communication frames from the first communication device to the second communication device and second communication frames from the second communication device to the first communication device, and a transmission permission signal for permitting transmission of one frame of data when a particular one of the second communication frames is available is transmitted from the first communication device to the second communication device;

one frame of data in three or more frames of data to be transmitted is transmitted from the second communication device to the first communication device in response to the transmission permission signal;

determination is made on the basis of the one frame of data as to whether or not continuous transmission of data subsequent to the one frame of data over a plurality of frames should be permitted;

a continuous transmission permission signal for permitting the continuous transmission is transmitted from the first communication device to the second communication device when the continuous transmission is permitted; and

the subsequent data is transmitted through a plurality of consecutive frames in the second communication frames in response to the continuous transmission permission signal.



14. A medium on which a computer program is recorded, the computer program enabling a computer having a communication function to function as a base station for use in a mobile communication system in which an offset time is set between downstream communication frames from the base station to a mobile station and upstream communication frames from the mobile station to the base station, and in which communication is performed by a slotted-ALOHA method, the base station having:

transmission permission signal transmitting means of transmitting, through a predetermined frame in the downstream communication frames, a transmission permission signal for permitting transmission of one frame of data when one of the upstream communication frames is available;

receiving means of receiving one frame of data transmitted from the mobile station through one of the upstream communication frames corresponding to the predetermined frame; and

continuous transmission permission signal transmitting means of determining whether or not continuous transmission of subsequent two or more frames of data should be permitted if the subsequent frames of data exists subsequently to the received one frame of data, and transmitting through the downstream communication frame a continuous transmission permission signal for permission of the continuous transmission when the continuous transmission is permitted.

15. A medium on which a computer program is recorded, the computer program enabling a computer having a communication function to function as a mobile station for use in a mobile communication system in which an offset time is set between downstream communication frames from a base station to the mobile station and upstream communication frames from the mobile station to the base station, and in which communication is performed by a slotted-ALOHA method, the mobile station having:

transmission permission signal receiving means of receiving a transmission permission signal from the base station;

leading data transmitting means of transmitting one frame of leading data through one of the upstream communication frames in response to the transmission permission signal if the data to be transmitted exists;

continuous transmission permission signal receiving means of receiving one of the downstream communication frames subsequently to transmission of the leading data to receive a continuous transmission permission signal; and

continuous transmission means of continuously transmitting data subsequent to the leading data through a plurality of frames in the upstream communication frames in response to the continuous transmission permission signal.